

REMARKS

Claims 1-4 are pending in this application. Claim 1 is amended to more particularly claim the invention. No new matter is believed to have been added by way of the amendment.

35 U.S.C. § 103 Rejections

Claims 1 and 2 were rejected by the Examiner under 35 U.S.C. 103(a) as allegedly being unpatentable over United States Patent No. 3,711,401 to Hamilton et al. (hereinafter "Hamilton") in view of United States Patent No. 5,393,416 to Kozak et al. (hereinafter "Kozak"), further in view of United States Patent No. 6,340,712 to Kunin et al. (hereinafter "Kunin").

Hamilton discloses a regeneration method for a dual bed of ion exchange resins. Hamilton's method is described in column 5, lines 4 to 8 and is as follows:

After column 20 has been regenerated, the column is rinsed [emphasis added] to remove any remaining regenerant. Typically, the rinse effluent from column 20 is passed through column 30 to use up any exchangeable regenerant ions in the rinse effluent.

The above operation is merely the rinsing (washing) operation of the ion exchange resin. That is, Hamilton does not disclose the following steps: repeating at least twice a step comprising passing an aqueous solution of regenerant through the regeneration tower downward from a top part of the regeneration tower and thereafter passing ultra-pure water through the regeneration tower upward from a bottom of the regeneration tower.

In the above specific operation, even if channeling occurs in a layer of ion exchange resin, the channeling is stopped with the result that the ion exchange resin can be regenerated efficiently and homogeneously, without the occurrence of non-uniform regeneration.

Further, the ion exchange resin can be washed while inside the tower and, in the present invention, the regeneration of ion exchange resin is carried out by the use of an ion exchange resin tower (regeneration tower) which is different from purifier towers. Therefore, the mixing of the regenerant in the purifier towers can be avoided, and there is no interruption of the purification of aqueous hydrogen peroxide solution. The above effects are not disclosed in Hamilton.

Kozak discloses the following in column 17, lines 19 to 29:

Mode VI-B is provided via controller 127 for rinsing IEX column 29 in an upflow direction 8 with DI water, and discharging the rinse water from the system for waste treatment. This upflow flushing operation is performed at a predetermined velocity for the flow of DI water to fluidize the ion exchange resin 30 in the IEX column 29, for substantially removing foreign particulate material from IEX column 29. In this manner, plugging of the IEX column 29 by the buildup of the foreign particulate material over a number of subsequent cycles of operation is prevented.

In other words, the above-mentioned method disclosed in Kozak is carried out to separate or to remove foreign particles from an ion exchange resin column based on the differences in their respective gravities or densities. The method of Kozak is different from the regeneration of an ion exchange resin.

Kunin discloses a non-chloride containing regenerant composition and method for regenerating water softeners. In Kunin, ultra-pure water is used in rinsing the resin bed. However, Kunin never includes the repeated downward application of an aqueous solution of regenerant and that ultra-pure water is applied, or the flow rates of either the aqueous solution of regenerant or the ultra-pure water, as in the present invention.

Therefore, claims 1 and 2 are not rendered obvious over Hamilton in view of Kozak and/or Kunin. Applicants respectfully request withdrawal of the rejection and allowance of claims 1 and 2.

The Examiner has rejected claims 3 and 4 under 35 U.S.C. 103(a) as being obvious over Hamilton, Kozak, and Kunin, further in view of United States Patent No. 4,652,352 to Saieva (hereinafter "Saieva").

Hamilton, Kozak, and Kunin are described above in the previous argument. Saieva discloses the process and apparatus for recovering metals from dilute solution. Saieva discloses a closed loop process and apparatus whereby metals may be recovered from spent electroplating rinse solutions for reuse in the electroplating bath with essentially no generation of waste. However, Saieva does not disclose how to regenerate the spent ion exchange resin. Furthermore, repeating the step twice of passing an aqueous solution of regenerant through the regeneration tower downward from a top part of the regeneration tower and thereafter passing ultra-pure water through the regeneration tower upward from the bottom of the regeneration tower is not disclosed in Saieva.

In the present invention, even if channeling is generated in a layer of ion exchange resin, the channeling is broken with the result that, without the occurrence of non-uniform regeneration, the ion exchange resin can be regenerated efficiently and homogeneously. Further, the ion exchange resin can be washed within the tower. Still further, in the present invention, the regeneration of ion resin is carried out by the use of an ion exchange resin tower (regeneration tower) which is different from purifier towers. Therefore, the mixing of the regenerant in the purifier towers can be avoided, and it is not needed to interrupt the purification of aqueous hydrogen peroxide solution.

Therefore, claims 3 and 4 are not obvious over Hamilton in view of Kozak, Kunin, and Saieva, and Applicants respectfully request that the rejection be withdrawn and that claims 3 and 4 be allowed.

The Examiner indicated at the end of the Office Action some additional relevant prior art, specifically United States Patent No. 3,989,624 to Wachsmuth (hereinafter "Wachsmuth"). Wachsmuth describes the regeneration and rinsing of the ion exchange resins in a downflow direction; upflow direction and/or rinsing could also be employed. However, Wachsmuth does not disclose the specific combination of the flow of aqueous solution of regenerant and ultra-pure water that is disclosed in the present invention. Therefore, the present invention is distinguishable from Wachsmuth.

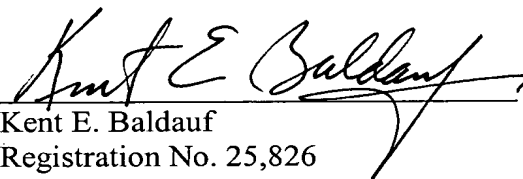
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In view of the foregoing remarks, it is believed that the present application is in condition for allowance. Reconsideration of the rejections and allowance of claims 1-4 are respectfully requested.

Respectfully submitted,

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